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- (54) **METAL PHOSPHIDE CATALYSTS AND METHODS FOR MAKING THE SAME AND USES THEREOF**
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- (58) **Field of Classification Search**
 None
 See application file for complete search history.

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The present disclosure relates to a method that includes heating a mixture that includes a metal phenylphosphine-containing precursor that includes at least one of Mo(PPh₃)₂(CO)₄, Pd(PPh₃)₄, Ru(PPh₃)₃Cl₂, Ru(PPh₃)₂(CO)₂Cl₂, Co(PPh₃)(CO)₂(NO), and/or Rh(PPh₃)₂(CO)Cl, a surfactant, and a solvent. The heating is to a target temperature to form a heated mixture containing a metal phosphide nanoparticle that includes at least one of MoP, Ru₂P, Co₂P, Rh₂P, and/or Pd₃P, and the metal phosphide nanoparticle is not hollow.

6 Claims, 21 Drawing Sheets